

## Problem

Natural disasters such as Hurricane Katrina in New Orleans and the tsunami in Japan in 2011 create emergency situations that must be dealt with quickly and effectively in order to minimize injury and loss of life. Simulating such events before they occur can help emergency responders fine-tune their preparations. To create the most accurate modeling scenarios, exercise planners need to know critical details of the event, such as infrastructure damage and numbers of immediate casualties or displaced citizens. Current modeling and simulation tools provide individual pieces of the desired information; however, until now, there has been no automated method for sharing information from the various models and compiling it into usable data to allow rapid and accurate assessment of the overall situation. Sandia has developed a new software architecture, the Standard Unified Modeling, Mapping & Integration Toolkit (SUMMIT), that provides this coupling ability.

## Innovative Edge

SUMMIT was developed with funding from the Department of Homeland Security's (DHS) Science and Technology (S&T) Directorate and the Federal Emergency Management Agency's (FEMA) National Exercise and Simulation Center to help emergency planners more effectively use and integrate advanced modeling and

simulation capabilities. These agencies have spent years designing models and simulations for disaster planning, but the various systems could not work together or share information. SUMMIT knits together different models to allow planners to quickly swap data and to set up new scenarios with existing information within minutes or even seconds. It is platform independent and can run on a desktop, laptop, or even on handheld devices such as smartphones or iPads.

SUMMIT users do not have to be experts in modeling and simulation. Rather, relevant information is simply entered into the system. The system then links to the appropriate models, distributes the data to the models in the proper format, performs any necessary translations to ensure consistency, then generates an integrated picture that can be used in the exercise. SUMMIT also allows for the recycling of the analysis. For example, if federal disaster emergency preparedness professionals conduct a large-scale earthquake exercise, the data generated through SUMMIT can be used by another entity to reproduce the emergency situation in a new location. This leads to overall cost savings by better leveraging the exercise funding.

## Commercialization and Industry Impact

SUMMIT technology is currently being transitioned to FEMA's National Exercise Division (NED) where it will be made available to the U.S. emergency preparedness community. Additional federal and international agencies are pursuing DHS S&T to leverage SUMMIT for their own use, including potentially acting as additional transition partners. During the transition period, Sandia is making SUMMIT freely available for government use and is pursuing open source licensing avenues.



**SUMMIT links together models and provides an integrated view of data results. The software offers a graphical view of damaged areas, making it easier for exercise participants to comprehend what is going on in the exercise and make better decisions.**